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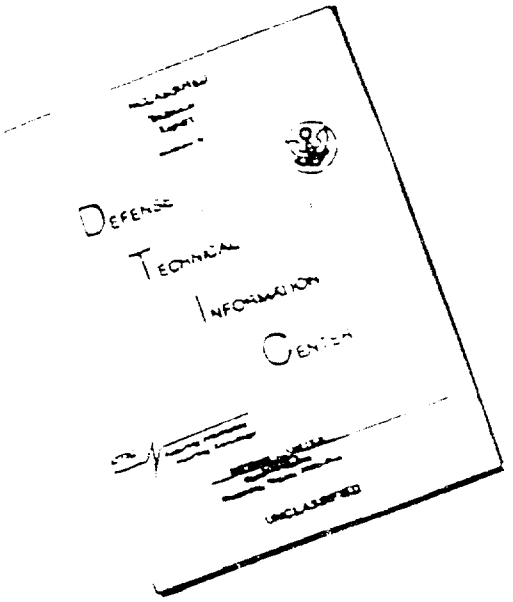

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64-11

TECHNICAL MEMORANDUM 1313

TEST PROGRAM TO ESTABLISH AN ACCEPTABLE NON-PROPRIETARY IGNITION CHARGE FOR THE M6 ELECTRIC BLASTING CAP

DUSAN GEORGEVICH

COPY 45 OF 50

FEBRUARY 1964

PICATINNY ARSENAL
DOVER, NEW JERSEY

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TECHNICAL MEMORANDUM 1313

TEST PROGRAM TO ESTABLISH AN ACCEPTABLE NON-PROPRIETARY IGNITION CHARGE FOR THE M6 ELECTRIC BLASTING CAP

BY

DUSAN GEORGEVICH

FEBRUARY 1964

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ABSTRACT

This program has been prepared to select and establish acceptability of a suitable dry-loaded, non-proprietary ignition charge for the M6 Electric Blasting Cap. Weight limits for the selected ignition charge will be established and verified through tests involving the determination of the ALL FIRE and NO FIRE currents and the ability of the caps to fire when connected in a series circuit.

In Part A, the methods are described for determining weight limits for the ignition charge and the range of consolidating pressures for the worst and best loading and firing conditions, and for verifying ALL FIRE and NO FIRE current for the weight limits obtained. Also, the effect of the presence of a binder (added wet or dry) is explored. Loading Schedule I and II are established to show the number of blasting caps to be loaded for each firing and loading condition required.

Part B presents a Testing Program to establish acceptability for the M6 Electric Blasting Cap of the non-proprietary dry ignition charge and loading conditions selected as a result of Part A.

INTRODUCTION

This program is intended to establish the testing procedures and schedule which will provide a non-proprietary ignition charge for the M6 Electric Blasting Cap. It is intended to supplement the results in the Final Report on Contract DA-19-020-ORD-5518, Test Request No. 15, Development of Non-Proprietary Ignition Mix for M6 Electric Blasting Cap.

OBJECTIVES

Part A

1. To determine the ignition charge weight limits for the worst and best combinations of firing and loading conditions and to establish the consolidating pressure range for each of three ignition charge variations, through ALL FIRE functioning, series and Run-Down Tests.

2. To verify the ALL FIRE current by determining the level at which functioning will occur 99.9% of the time for the worst combination of firing and loading conditions for the selected ignition charge.

3. To verify the NO FIRE current by determining the level at which functioning will not occur 99.9% of the time for the best combination of firing and loading conditions for the selected ignition charge.

Part B

To establish the acceptability of the selected non-proprietary ignition charge for the M6 Electric Blasting Cap.

PROCEDURES FOR PART A

Part A

1. Determination of weight limits and consolidating pressures for worst and best loading and firing conditions for each variation of the ignition charge.

Worst Condition - This is the minimum charge weights (ignition charge, intermediate and base charge), maximum loading pressures, and minimum temperature (-65°F).

Best Condition - This is the maximum charge weights, minimum loading pressures and maximum temperature (160°F).

The technique used for plug insertion for different consolidating pressures should insure the maintenance of accurate insertion pressure and should hold bridgewire breakage to a minimum. To avoid pick-up of powder the face of consolidating punch should be chrome plated.

For each group and condition the tests to be performed are:

(1) Resistance before and after conditioning for each cap.

(2) No-functioning in accordance with MIL-C-45468A(ORD), Paragraph 4.3.4 under indicated conditions for each cap.

(3) Ten caps individual functioning in accordance with the specifications in Paragraph 4.3.3 of Specification MIL-C-45468A(ORD) except that functioning time shall be measured and recorded for each cap. These caps to be functioned under test conditions (-65° and 160°F).

(4) Ten caps shall be tested in series applying 1.5 amps DC through the circuit for a period not exceeding 50 milliseconds. Total line resistance and first bridgewire break time to be recorded. Total line resistance to be maintained constant (32 ohms) for each series test in this program.

(5) Perform a Run-Down Test with 10 caps for each test level, starting with 0.45 amps and with decreasing increments of 0.05 amps until the NO FIRE level is reached. This is to determine 50% point, ALL FIRE and NO FIRE current levels.

(6) In regard to these tests, DC firing should be performed in accordance with Figure 1.

(7) Series firing to be in accordance with the requirements of MIL-C-45468A(ORD) Paragraph 4.3.2 as depicted in Figure 2.

Table A and A1 contain the loading schedules.

In six groups (Table A) each for the worst and the best loading and firing conditions, the caps should be loaded with different weights of non-proprietary ignition charge and the corresponding consolidating pressures determined during loading in accordance with the fixed length requirements for cap and plug. Tests to be performed are indicated in Table A.

The next step is to load 160 caps in accordance with Table A_1, Group $1A_1$(ignition charge without binder). The remaining groups outlined in Table A_1 should be accomplished only if the test results with the initial 160 caps in Group $1A_1$ are satisfactory. If not satisfactory, then an additional 160 caps with the same ignition charge as in Table A, except that the Egyptian Lacquer will be in powder form, should be loaded and tested as in Group $1A_1$. If results are favorable, loading and testing as specified in Table A_1 should be completed with this ignition charge. If results are unfavorable, continue the program as in Table A only.

Results will be sufficient to offer a choice for selection of minimum and maximum weights of non-proprietary ignition charge and the consolidating pressure ranges.

A dependable determination of minimum-maximum weight limits and consolidating pressures cannot be made only from the functional and sensitivity factors; mechanical factors must be considered; these factors are related to the percentage of bridgewire breakage. A record of bridgewire breakage should be made for each group and condition.

2. Verification of ALL FIRE and NO FIRE Points for Current (This test to be conducted after maximum and minimum ignition charge weights are determined.)

ALL FIRE POINT

Conduct a Bruceton Test by varying the current in increments of 10 milliamperes assuming a normal distribution. Use the worst firing and loading conditions of minimum firing temperature, minimum charge

weights and maximum loading pressures for all three charges. Calculate the average current after testing 50 items. Then, using the Bruceton results insofar as possible, conduct a Run-Down Test by testing 25 items at each of 5 current levels: the average current (x), (x) ± 10 ma, (x)±20 ma. Calculate the current at the ALL FIRE point by plotting the Run-Down Test results on probability paper. If this value is significantly different from 0.45 amps, verify the ALL FIRE point by testing an additional 100 items at the newly calculated ALL FIRE point.

NO FIRE Point

Conduct a Bruceton Test by varying the current in increments of 10 milliamperes, assuming a normal distribution. Use the most favorable firing and loading conditions (maximum firing temperature, maximum charge weights and minimum pressure for all three charges). Calculate the average current after testing 50 items in this test. Then, using the Bruceton results insofar as possible, conduct a Run-Down Test by testing 25 items at each of five current levels: the average current (x), (x)±10 ma, (x) ± 20 ma. Calculate the current at the NO FIRE point by plotting the Run-Down Test results on probability paper. If this value is significantly different from 0.20 amperes, verify the NO FIRE point by testing an additional 100 caps at the newly calculated NO FIRE point.

LOADING SCHEDULE FOR PART A

1. Determination of weight limits and consolidating pressures for non-proprietary ignition charge for:

a. Worst Condition (at -65°F and for 6 Groups):

Base charge	813 ±5 mg at pressure 31 lbs dead load
Intermediate charge	208 ±5 mg at pressure 31 lbs dead load
Ignition charge	(6 different weights at 6 corresponding pressures as in Table A) Total caps = 480

b. Best Condition (at 160°F and for 6 Groups):

Base charge	943 ±5 mg at pressure 26 lbs dead load
Intermediate charge	270 ±5 mg at pressure 26 lbs dead load
Ignition charge	(6 different weights at 6 corresponding pressures as in Table A) Total caps = 480

c. From Table A_1, Group $1A_1$, first trial ... 160 caps
From Table A_1, Group $1A_1$, second trial 160 caps (if necessary)
From Table A_1 (to complete the table if necessary) 800 caps

2. ALL FIRE and NO FIRE Current Points Verification

a. ALL FIRE Point

	Min. Wt.	Max. Pressure	No.
Base Charge	813 mg	31 lbs	
Intermediate Charge	208 mg	31 lbs	
Ignition Charge	See below *	As determined before	175 caps

*Use minimum ignition charge weight and maximum pressure established in "Procedures for Part A" and fire at 160°F.

b. NO FIRE Point

	Max. Wt.	Min. Pressure	No.
Base Charge	943 mg	26 lbs	
Intermediate Charge	270 mg	26 lbs	175 caps
Ignition Charge	See below *	See below *	

* Use maximum charge weight and minimum pressure established in "Procedures for Part A" and fire at 160°F.

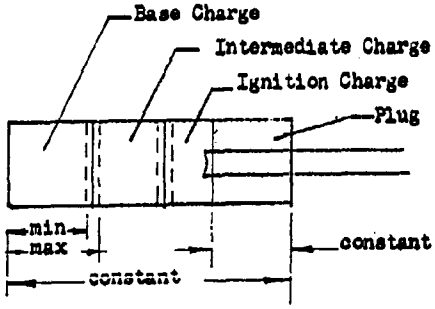
c. Load 100 additional caps as in Phase 2a and fire at -65°F and the ALL FIRE current found in Phase 2a (if additional verification is necessary).

d. Load 100 additional caps as in 2b to fire at 160°F and the NO FIRE current found in 2b (if additional verification is necessary).

TABLE A

For Determination of Weight Limits and Consolidating Pressures for Ignition Charge for No 6 Electric Blasting Cap

Nomenclature		Loading of Charges						Temp, °F	Bridgewire Breakage	Tests			Total Caps Required
		Base		Intermediate Ignition						Functioning Time	Series @ 1.5 amp	Run-Down Test	
Group	Condition	Wt (mg)	Press (lbs)	Wt (mg)	Press (lbs)	Wt (mg)	Press (lbs)						
1A	Worst	813	31	208	31	150	*	-65	*	10	10	60	80
	Best	943	26	270	26	150	*	+160	*	10	10	60	80
2A	W	813	31	208	31	140	*	-65	*	10	10	60	80
	B	943	26	270	26	140	*	+160	*	10	10	60	80
3A	W	813	31	208	31	130	*	-65	*	10	10	60	80
	B	943	26	270	26	130	*	+160	*	10	10	60	80
4A	W	813	31	208	31	120	*	-65	*	10	10	60	80
	B	943	26	270	26	120	*	+160	*	10	10	60	80
5A	W	813	31	208	31	110	*	-65	*	10	10	60	80
	B	943	26	270	26	110	*	+160	*	10	10	60	80
6A	W	813	31	208	31	100	*	-65	*	10	10	60	80
	B	943	26	270	26	100	*	+160	*	10	10	60	80
											Total		960



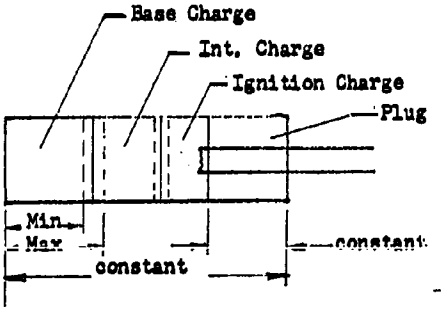
*Determined during loading

NOTES:

1. Tolerances on weights to be ± 5 mg in all cases.
2. Tolerances on pressures to be ± 2 lbs
3. Ignition charge:
   Lead Thiocyanate----------32±2%
   Potassium Chlorate--------40±2%
   Charcoal------------------18±1%
   Egyptian Lacquer----------10±1%
   (See Appendix B)

TABLE A_1

Nomenclature		Loading of Charges						Temp °F	Bridgewire Breakage	Tests			Total Caps Required
		Base		Intermediate		Ignition							
Group	Condition	Wt (mg)	Press (lbs)	Wt (mg)	Press (lbs)	Wt (mg)	Press (lbs)			Functioning Time	Series at 1.5 amps	Run-Down Test	
$1A_1$	W	813	31	208	31	150	*	-65	*	10	10	60	80
	B	943	26	270	26	150	*	+160	*	10	10	60	80
$2A_1$	W	same as $1A_1$				140	*	-65	*	10	10	60	80
	B					140	*	+160	*	10	10	60	80
$3A_1$	W	same as $1A_1$				130	*	-65	*	10	10	60	80
	B					130	*	+160	*	10	10	60	80
$4A_1$	W	same as $1A_1$				120	*	-65	*	10	10	60	80
	B					120	*	+160	*	10	10	60	80
$5A_1$	W	*				110	*	-65	*	10	10	60	80
	B					110	*	+160	*	10	10	60	80
$6A_1$	W	*				100	*	-65	*	10	10	60	80
	B					100	*	+160	*	10	10	60	80
											Total		960



*Determined during loading

NOTE:

1. Tolerances on weights to be ±5 milligram in all cases.
2. Tolerances on pressures to be ±2 pounds
3. Ignition Charge:
   Lead Thiocyanate.....35.6 ± 2%
   Potassium chlorate.....44.4 ± 2%
   Charcoal.....20.0 ± 1%
   (See Appendix B)

SUMMARY OF LOADING SCHEDULE FOR PART A

1. Weight limits determination:

Table A		960
Table A1 (use first 160 caps and additional if necessary)	160	320
2. ALL FIRE current verification		175
3. NO FIRE current verification		175
	Total (min.)	1,630 caps
4. Additional from Table A1 (if necessary)		800
5. 2c and 2d additional caps (if necessary)		200
	Total (max.)	2,630 caps

PROCEDURES FOR PART B

I. Accomplish the following:

1. Load 1,750 M6 caps containing minimum weight of proposed ignition charge.

a. 875 of these caps to have minimum base charge (813 mg plus or minus 5 mg), pressed at maximum pressure and minimum intermediate charge (270 mg plus or minus 5 mg) pressed at maximum pressure.

b. 875 of these caps to have maximum base charge (943 mg ± 5 mg) pressed at minimum pressure (26 lbs dead load) and maximum intermediate charge (270 mg ± 5 mg) pressed at minimum pressure (26 lbs dead load).

2. Load 1,750 M6 caps containing maximum weight of proposed ignition charge.

a. Same as in 1a above.
b. Same as in 1b above.

3. Twenty-five M6 caps from each of the sub-groups 1a, 1b, 2a, and 2b above shall be conditioned at -65°F overnight and then tested individually for functioning at -65°F.

4. Same as 3, above, except conditioning and test temperature shall be 160°F.

5. Twenty-five caps from each of the sub-groups 1a, 1b, 2a, and 2b above shall be tested at 1.5 amp. DC to determine the pulse times and the total functioning times.

6. One hundred and twenty caps from each of the sub-groups shall be tested at ambient temperature in groups of 10 in series as follows:

a. Four groups shall be tested using a 10-cap blasting machine complying with Specification W-B-411, Group B, Type I through a total resistance of 32 ohms.

b. Four groups shall be tested by applying 1.5 amp. DC through the circuit for a period not exceeding 50 milliseconds.

c. Same as b except the current shall be 0.45 amps. DC instead of 1.5 amp.

7. Same as 6 except the caps shall be conditioned at -65°F for 16 hours minimum.

8. Same as 6 except the caps shall be conditioned at 160°F for 16 hours minimum.

9. Same as 6 except the caps shall be subjected to the waterproofness test as specified in Paragraph 4.3.2 of Specification MIL-C-45468A.

10. Four groups, each group consisting of 80 caps connected in series, shall be tested by applying 1.5 amp DC through the circuit for a period of not exceeding 50 milliseconds. Each group of 80 caps shall consist of 20 caps each from sub-groups 1a, 1b, 2a, and 2b.

11. Same as 10, except caps shall be conditioned at -65°F for 16 hours minimum.

12. Same as 10, except caps shall be conditioned at 160°F for 16 hours minimum.

13. Same as 10, except caps shall be subjected to the waterproofness test as specified in Paragraph 4.3.2 of Specification MIL-C-45468A.

II. Upon satisfactory completion of I, load 3,900 M6 caps made up of the following groups:

GROUP I -- 1,950 caps in accordance with current Drawing P-132000 requirements, except that ignition charge weight shall be proposed minimum weight.

GROUP II -- 1,950 caps in accordance with current Drawing P-132000 requirements except that ignition charge weight shall be proposed maximum weight.

The caps from each group shall be conditioned and tested in accordance with the following plan:

1. One hundred and ten caps shall be subjected to waterproofness test and tested as specified in Paragraph 4.3.2 of Specification MIL-C-45468A (Amendment 4) except that 30 caps shall be tested individually. Eighty caps connected in series, shall be tested by applying 1.5 amp. DC through the circuit for a period not exceeding 50 milliseconds.

2. One hundred and ten caps shall be tested for functioning at ambient temperature. Thirty caps shall be tested individually. Eighty caps connected in series shall be tested by applying 1.5 amp DC through the circuit for a period not exceeding 50 milliseconds.

3. One hundred and ten caps (not packed) shall be conditioned at -65°F for 16 hours minimum and then tested for functioning at ambient temperature. Thirty caps shall be tested individually. Eighty caps connected in series shall be tested by applying 1.5 amp. DC through the circuit for a period not exceeding 50 milliseconds.

4. Same as 3 except the conditioning temperature shall be 160°F.

5. Same as 3 except the conditioning testing temperature shall be 125°F.

6. Two hundred and thirty caps shall be subjected to seven-day temperature and humidity cycle. Thirty of these caps shall be tested individually for functioning. One hundred and twenty caps shall be tested in groups of 10 in series as follows:

a. 4 groups shall be tested as specified in I 6a above.
b. 4 groups shall be tested as specified in I 6b above.
c. 4 groups shall be tested as specified in I 6c above.
d. 80 caps shall be connected in series and tested by applying 1.5 amp. DC through the circuit for a period not exceeding 50 millseconds.

7. Same as 6 except conditioning shall be for 14 days.

8. Same as 6 except conditioning shall be for 21 days.

9. Same as 6 except conditioning shall be for 28 days.

10. Same as 6 except conditioning shall be at 160°F for 30 days.

11. Two hundred and fifty caps shall be utilized in a Bruceton-type test to determine the time energy (milliwatt-second) curve at -40°F and ambient temperature.

NOTES

A. On individual functioning tests, the tests shall be conducted as specified in Paragraph 4.3.3 . . of Specification MIL-C-45468A except that functioning times shall be taken and recorded for each cap.

B. All caps shall be checked as follows:

1. DC Resistance - shall be 1.6 ± 16 ohms including 12 foot leads - before conditioning.

2. Non-functioning - item shall withstand a pulse of 200 ma for five seconds (prepulsion).

3. DC Resistance after 2.

4. Over-all length and diameter.

5. For all functioning tests record functioning time, peak voltage, and peak current, record first bridgewire break time for all series.

C. Loading and testing of all caps for this test program shall be witnessed by Picatinny Arsenal representative.

D. A program now in process will establish the compatibility of the non-proprietary ignition mix.

E. A program will be conducted to establish sufficient evidence of capability to properly function demolition explosives and end items in accordance with MIL-C-45468A, Paragraph 6.1 for the M6 Blasting Cap with steel cup and non-proprietary ignition mix.

F. Inspection records showing that dimensional requirements were met shall be furnished by the manufacturer.

TABLE B

Item	Ignition Charge Weight	Ignition Charge Pressure	Intermediate Charge Weight	Intermediate Charge Pressure	Base Charge Weight	Base Charge Pressure	Required Caps
Phase B-I1 (a)	Min*	Max*	208	31	813	31	875
Phase B-I1 (b)	Min*	Max*	270	26	943	26	875
Phase B-I2 (a)	Max*	Min*	208	31	813	31	875
Phase B-I2 (b)	Max*	Min*	270	26	943	26	875
Phase B-II (1)	Min*	Max*	As Indicated In				1,950
Phase B-II (2)	Max*	Min*	Drawing P-132000				1,950
						Total =	7,400

* Values obtained from tests performed in Phase A.

Complete Summary of Loading Schedule

1. From Table A		960 caps
From Table A1		320 caps
2. All Fire Verification		175 caps
No Fire Verification		175 caps
From Table B		7,400 caps
	Total (Min)	9,030 caps
Additional (Table A1 - if necessary)		800 caps
Additional (if necessary)		200 caps
	Total (Max)	10,030 caps

APPENDICES

APPENDIX A

FIGURES

FIGURE 1

DC FIRING CIRCUIT SCHEMATIC

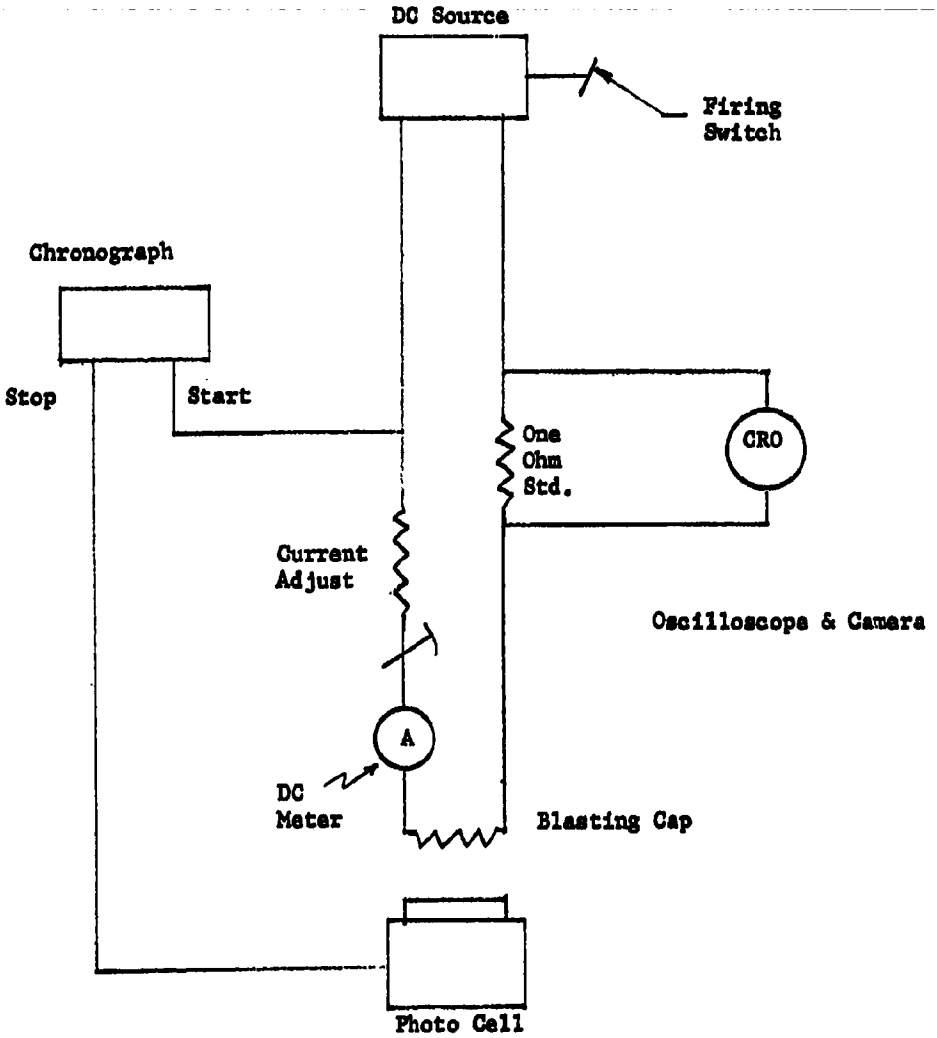
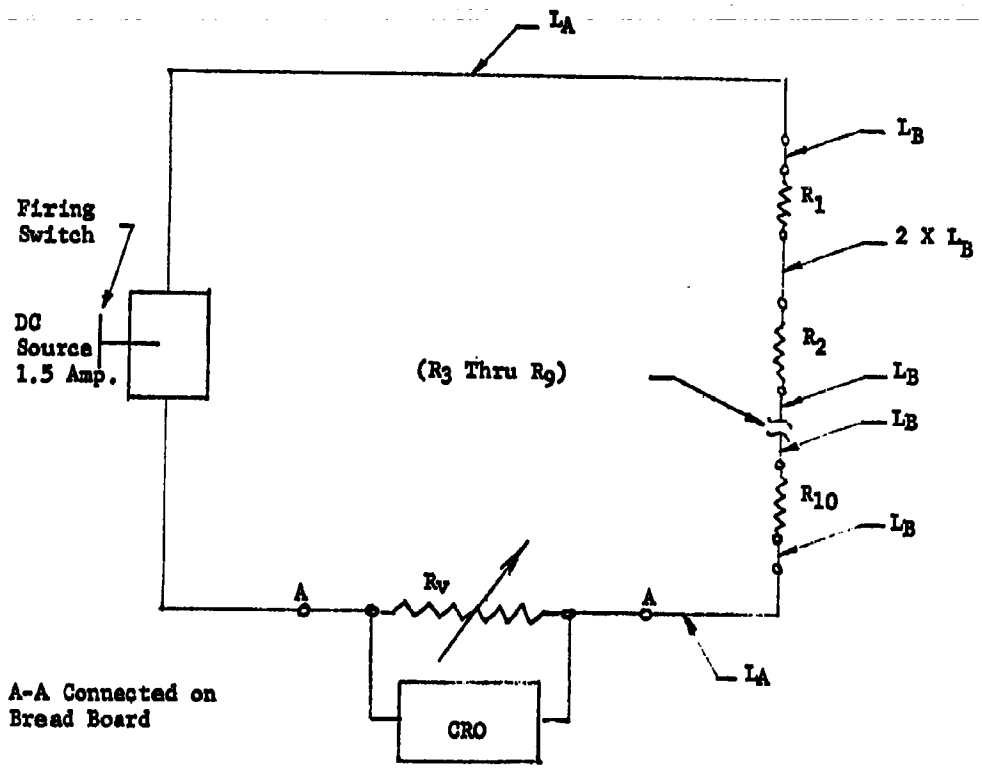


FIGURE 2

SERIES FIRING CIRCUIT SCHEMATIC



DC Source of 1.5 Amperes Max. Applied to the Circuit for a Period Not Exceeding 50 Milliseconds.

R_V Variable Resistor

CRO Oscilloscope

R_1 - R_{10} Blasting Caps

L_A Leadwire Line

L_B 12 Ft. of Lead wire

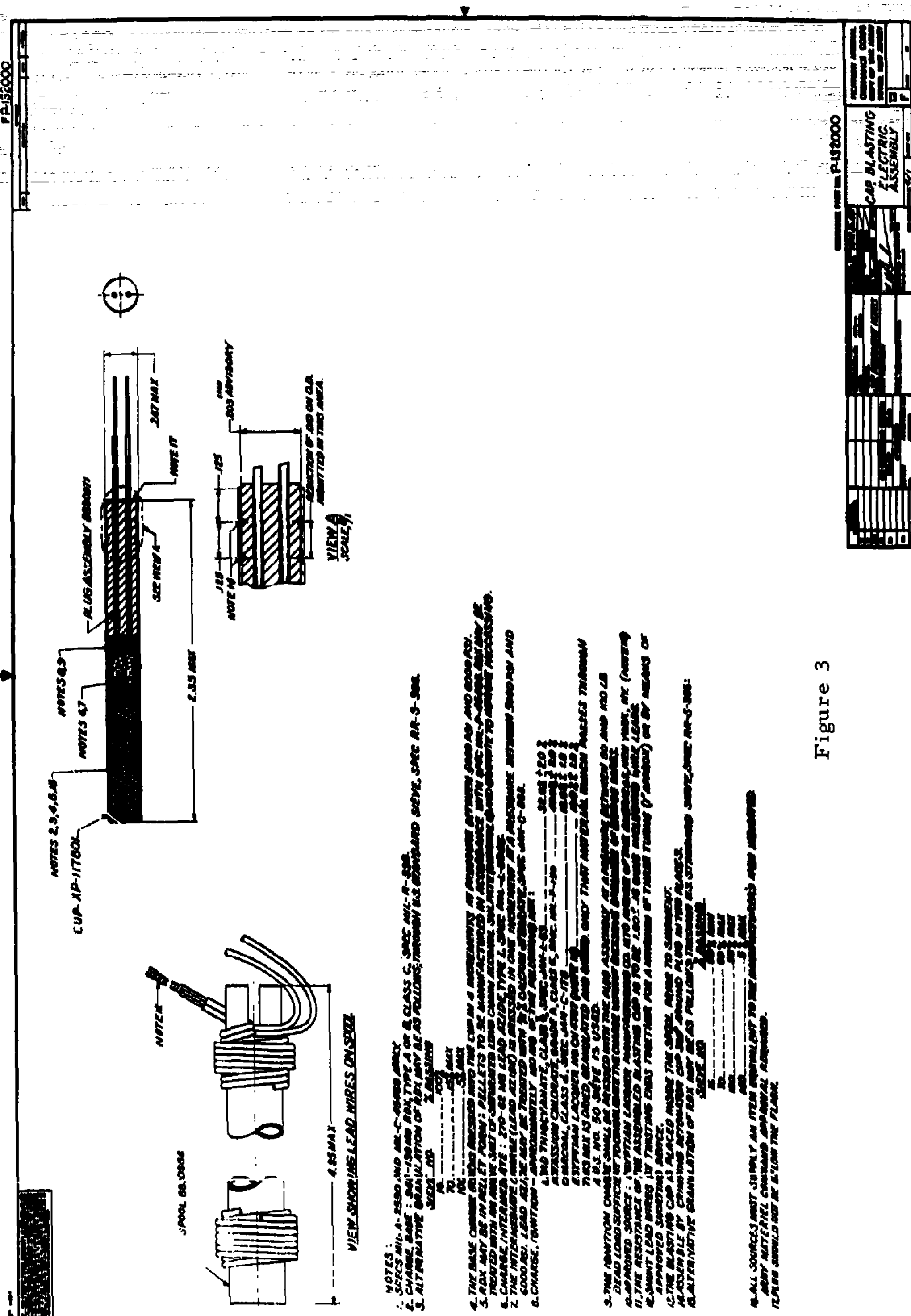


Figure 3

NOTE

The following corrections should be observed in utilizing drawing C8830971:

Note 4: "180 ohms per ft" should be "180 ohms per CMF".

Note 5: "MIL-W-3861" should be "QQ-W-343".

Note 6: "MIL-M-3412" has been superceded by "MIL-P-22985" "Nylon (2 y tel 34)" should be "Nylon (Zytel 34)".

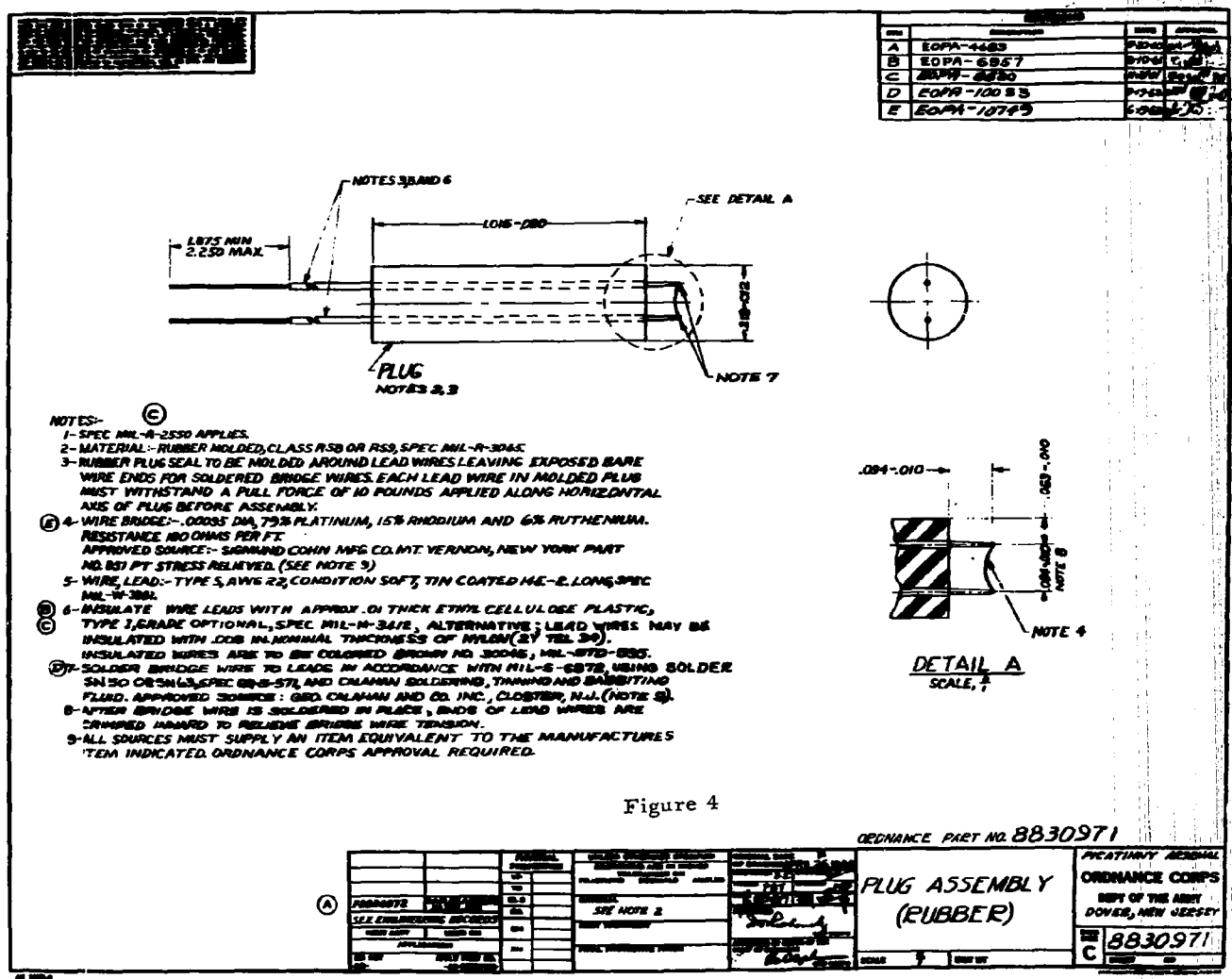


Figure 4

ORDNANCE PART NO. 8830971

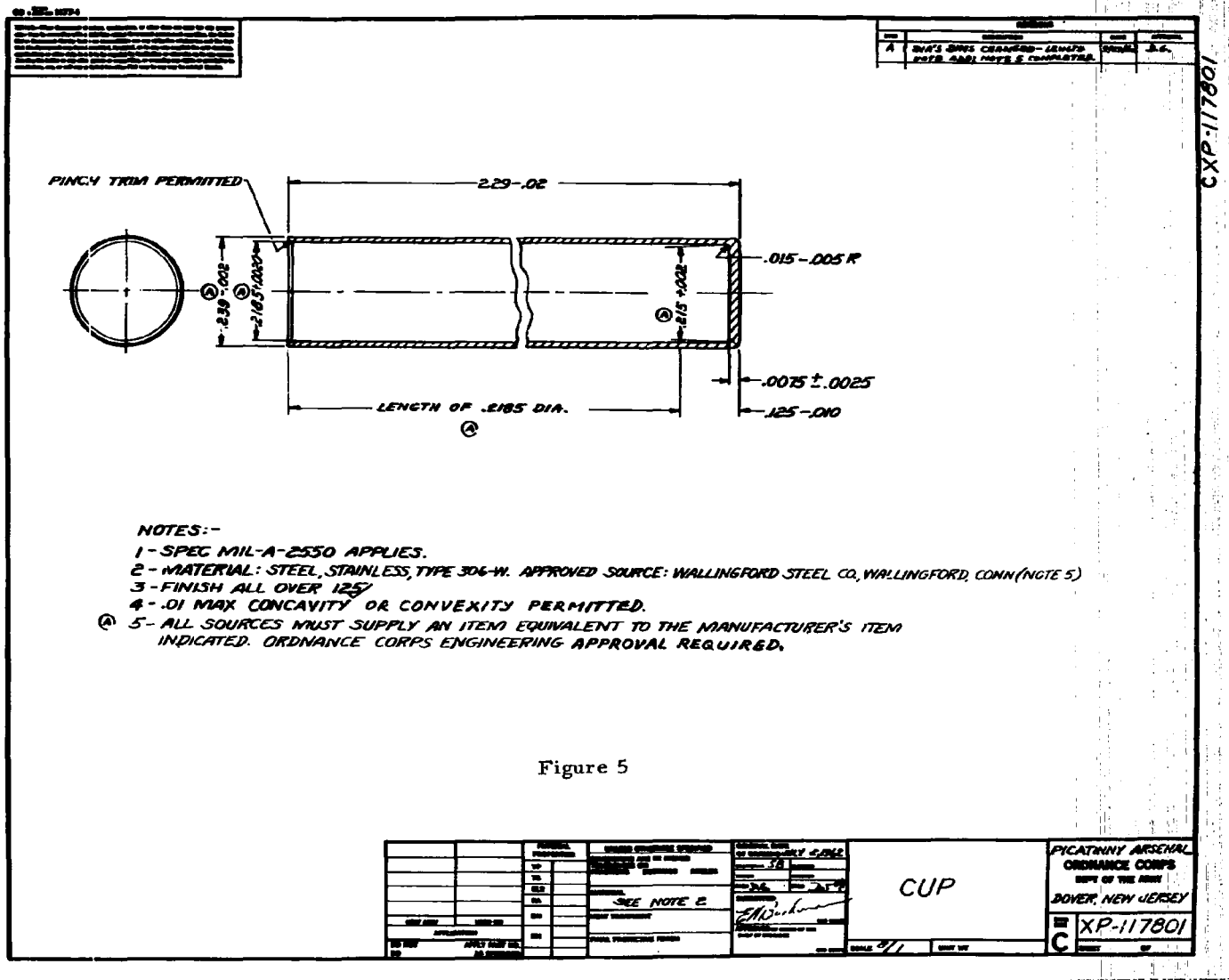

PINCH TRIM PERMITTED
2.29-.02
.015-.005 R
.2185 +.002
.2185 +.0025 -.0000
.239 .002
.0075 ± .0025
LENGTH OF .2185 DIA. (4)
.125-.010
NOTES:-
1-SPEC MIL-A-2550 APPLIES.
2-MATERIAL: STEEL, STAINLESS, TYPE 304-W. APPROVED SOURCE: WALLINGFORD STEEL CO, WALLINGFORD, CONN (NOTE 5)
3-FINISH ALL OVER 125
4-.01 MAX CONCAVITY OR CONVEXITY PERMITTED.
(4) 5-ALL SOURCES MUST SUPPLY AN ITEM EQUIVALENT TO THE MANUFACTURER'S ITEM INDICATED. ORDNANCE CORPS ENGINEERING APPROVAL REQUIRED.
SEE NOTE 2
CUP
PICATINNY ARSENAL
ORDNANCE CORPS
DOVER, NEW JERSEY
C
XP-117801

Figure 5

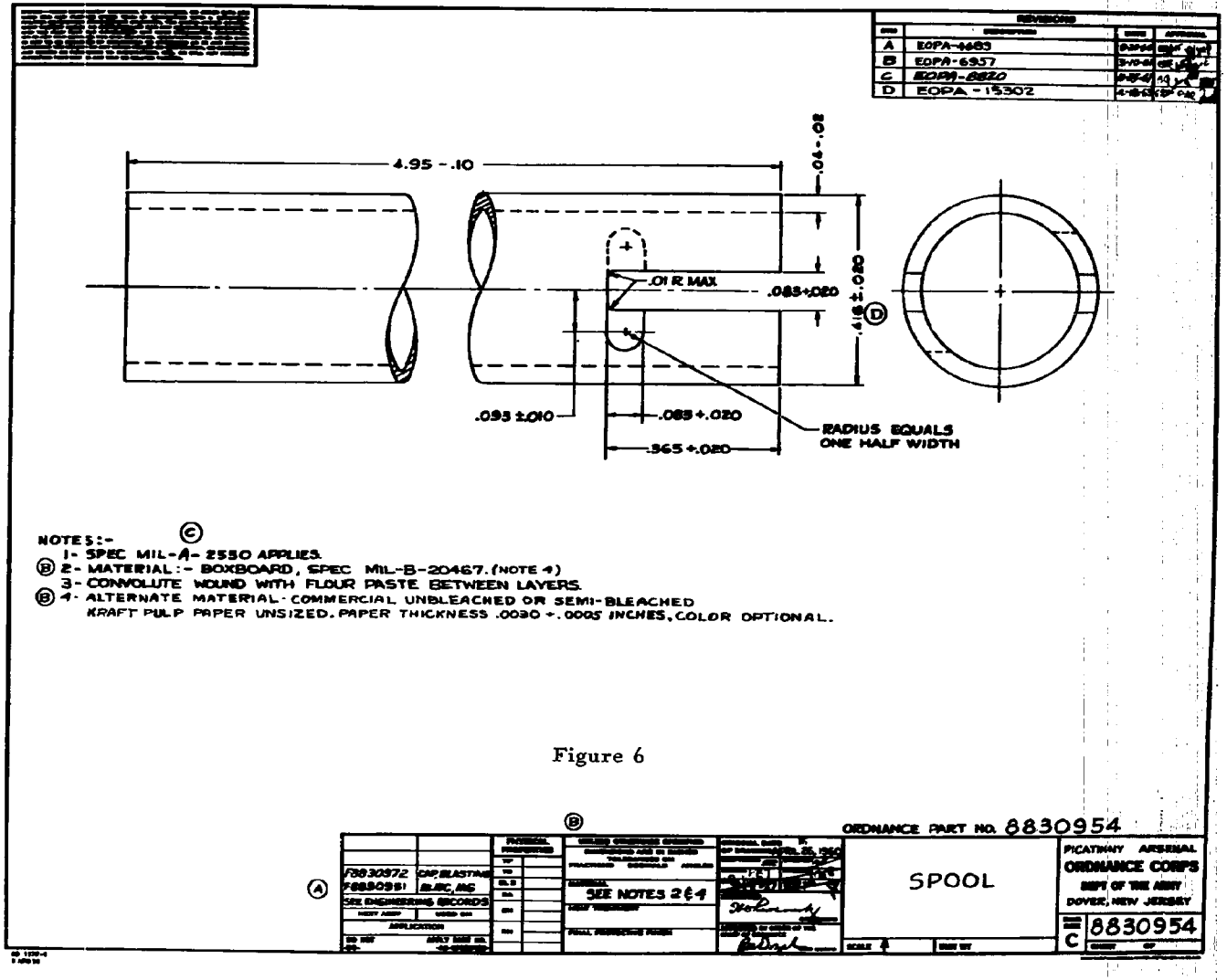

REVISIONS
A EOPA-4683
B EOPA-6957
C EOPA-8820
D EOPA-15302
4.95 -.10
.04 -.02
.01 R MAX
.085+.020
.415 ±.020
.093 ±.010
.085+.020
.965+.020
RADIUS EQUALS ONE HALF WIDTH
NOTES:-
1- SPEC MIL-A- 2550 APPLIES.
2- MATERIAL:- BOXBOARD, SPEC MIL-B-20467. (NOTE 4)
3- CONVOLUTE WOUND WITH FLOUR PASTE BETWEEN LAYERS.
4- ALTERNATE MATERIAL- COMMERCIAL UNBLEACHED OR SEMI-BLEACHED KRAFT PULP PAPER UNSIZED. PAPER THICKNESS .0030 +.0005 INCHES, COLOR OPTIONAL.
F8830972
F8830951
SEE NOTES 2&4
SPOOL
ORDNANCE PART NO. 8830954
PICATINNY ARSENAL
ORDNANCE CORPS
DEPT OF THE ARMY
DOVER, NEW JERSEY
C 8830954

Figure 6

APPENDIX B

PROCEDURES

PROCEDURE FOR MANUFACTURING DRY M6 IGNITION CHARGE (#1)

COMPOSITION

Ingredient	Percent	150-Gram Batch
Lead thiocyanate	32.0 ± 2	48.0 grams
Potassium chlorate	40.0 ± 2	60.0 grams
Charcoal	18.0 ± 1	27.0 grams
Egyptian lacquer	10.0 ± 1	15.0 grams

CHEMICAL SPECIFICATIONS

A. Lead thiocyanate: Class b, Spec. JAN-L-65.

B. Potassium chlorate: Grade A, class 6, Spec MIL-P-150

C. Charcoal: Class d, Spec. JAN-C-178

D. Egyptian lacquer: No. CN4707

PROCEDURE

A. Weigh the above ingredients on a triple-beam balance or a torsion balance.

B. Pour into a quart Abbé jar approximately half full of 1/2" dia. stainless steel balls.

C. Weigh the Egyptian lacquer in a tared container.

D. Pour over the composition and rinse the tared container with 50c.c. of butyl acetate. (Spec TT-B-888)

E. Use enough additional butyl acetate to cover stainless steel balls. Allow ingredients to become thoroughly wet before sealing the Abbé jar and moving to mill.

PROCEDURE FOR MANUFACTURING DRY M6 IGNITION CHARGE (Cont'd)

F. Seal the Abbé jar with a rubber gasket and top assembly. Place the Abbé jar on the mill and roll for one minute. Check the jar for leaks and mill for one hour.

G. Remove the jar from the mill and remove seal and top assembly. Clean the gasket and top using butyl acetate in an atomizer.

H. Place a wire screen over the Abbé jar and pour contents into a Mason jar.

I. Rinse the stainless steel balls with butyl acetate using circular motion. Use approximately 50c.c. and repeat until all the composition is rinsed from balls and jar.

J. Place the Mason jar in the evaporation chamber with cover off. Evaporate until approximately 1/16-inch of butyl acetate remains over the mix.

NOTE: ALL FURTHER OPERATIONS TO BE CONDUCTED BEHIND A SUITABLE BARRICADE. OPERATOR TO WEAR ASBESTOS GLOVES.

K. Thoroughly incorporate the remaining butyl acetate in the mix using a wooden spatula.

L. Pour the mix onto aluminum foil sheets and allow remaining butyl acetate to evaporate (approximately 16 hours).

M. Break mix into small sections using wooden spatula.

N. Crush mix on aluminum foil with rolling action using a long, hardwood, rolling pin.

NOTE: CRUSH SMALL AMOUNT ONLY.

O. Transfer crushed mix to a 50-mesh U. S. standard sieve and screen. A soft rubber spatula may be used to help pass mix through the sieve. Material which does not pass through the 50-mesh sieve is recrushed.

P. Transfer the material that has passed through the 50-mesh sieve to a drying pan, and dry at 120°F a minimum of 16 hours.

PROCEDURE FOR MANUFACTURING DRY M6 IGNITION CHARGE (Cont'd)

Q. Transfer dry mix to a conductive rubber container and store in dry area until use.

NOTE: AMOUNT OF MATERIAL SHOULD BE KEPT TO A MINIMUM FOR EACH OPERATION.

PROCEDURE FOR MANUFACTURING DRY M6 IGNITION CHARGE (#2)

I Composition

Ingredient	Percent
Lead thiocyanate	35.6 ± 2%
Potassium chlorate	44.4 ± 2%
Charcoal	20.0 ± 1%

II Chemical Specifications

a. Lead thiocyanate - Class b, Spec. JAN-L-65.

b. Potassium chlorate - Grade A, class 6, Spec. MIL-P-150.

c. Charcoal - class d, Spec JAN-C-178

III Procedure (for small - size batches)

The required amounts of potassium chlorate, lead thiocyanate, and charcoal are placed in a square, conductive-rubber blending bowl mounted at a 45° angle and the bowl is sealed with a plastic cover. The ingredients are blended by revolving the bowl about its axis at an average rate of 15 revolutions per minute for a period of 30 minutes. The dry mixture, is to be passed through a U. S. No. 50 mesh sieve, and then placed in a conductive rubber container and stored in a dry area until use.

PROCEDURE FOR MANUFACTURING DRY M6 IGNITION CHARGE (#3)

I Composition

Ingredient	Percent
Lead thiocyanate	32 ± 2%
Potassium chlorate	40 ± 2%
Charcoal	18 ± 1%
Egyptian lacquer in powder form	10 ± 1%

II Chemical Specifications

Lead thiocyanate, Class b, Spec. JAN-L-65.
Potassium chlorate, Grade A, Class 6 - Spec MIL-P-150.
Charcoal - Class d, Spec. JAN-C-178.
Egyptian lacquer in powder form.

III Procedure

The same as for #2 charge.

ABSTRACT DATA

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Accession No. _____ AD _____

Picatinny Arsenal, Dover, New Jersey

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Dusan Georgevich

Technical Memorandum 1313, February 1964, 30 pp, figures. Unclassified report from the Artillery Ammunition Laboratory, Ammunition Engineering Directorate.

This program has been prepared to select and establish acceptability of a suitable dry-loaded, non-proprietary ignition charge for the M6 Electric Blasting Cap. Weight limits and consolidating pressures for the selected ignition charge will be established and verified through tests involving the determination of ALL FIRE and NO FIRE currents and the ability of the caps to fire when connected in a series circuit.

UNCLASSIFIED

1. Detonators - Blasting Caps
2. M6 Electric Blasting Caps

I. Georgevich, D.

UNITERMS

M6 Electric Blasting Caps
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Binder
Non-proprietary ignition mix
Base charge
Bridgewire
Circuit
Consolidating pressures
Bruceton Test
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